



## Imaging neuronal pathways with $^{52}\text{Mn}$ PET in rats

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## PS01-083

### Poster Viewing Session I

#### Imaging neuronal pathways with $^{52}\text{Mn}$ PET in rats

**H. Napieczynska<sup>1,2</sup>, G.W. Severin<sup>3</sup>, J. Fonslet<sup>3</sup>, A. Menegakis<sup>4</sup>, S. Wiehr<sup>1</sup>, B.J. Pichler<sup>1</sup> and C. Calaminus<sup>1</sup>**

<sup>1</sup>Eberhard Karls University Tuebingen, Werner Siemens Imaging Center, Department of Preclinical Imaging and Radiopharmacy, Tuebingen, Germany

<sup>2</sup>International Max Planck Research School for Cognitive and Systems Neuroscience, Tuebingen, Germany

<sup>3</sup>Technical University of Denmark, The Hevesy Laboratory, Center for Nuclear Technologies, Roskilde, Denmark

<sup>4</sup>Eberhard Karls University Tuebingen, Medical Faculty and University Hospital, Department of Radiation Oncology, Tuebingen, Germany

#### Abstract

**Objectives:** We aimed at applying  $^{52}\text{Mn}$  for PET imaging of neuronal pathways in rats, and testing potential toxicity of the tracer to the dopaminergic neurons.

**Methods:**  $^{52}\text{Mn}$  was produced by proton irradiation of  $^{nat}\text{Cr}$ . We have elaborated the purification procedure and the tracer was prepared for intracerebral administration in Na ascorbate-buffered saline. Rats were stereotactically injected into the ventral tegmental area (VTA) or striatum (STR) with app. 170kBq and scanned 24 h later. Behavioral (rotameter test) and histological (TH-staining) evaluation was performed after 4 weeks. Another group of rats was injected with a reduced radioactivity dose and the same toxicity evaluation took place at three time points. The influence of the radiation dose on the DNA integrity was tested with  $\gamma\text{H2AX}$ -staining in a separate experiment. Finally, gradual transport of  $^{52}\text{Mn}$  along the dopaminergic pathways was imaged continuously for 6 h in additional animals.

**Results:**  $^{52}\text{Mn}$  transport along the mesolimbic and nigrostriatal pathways was clearly visible in PET images of the VTA-injected rats, as well as along the striatonigral tracts following the intra-striatal administration. Quantitative analysis of the PET data confirmed the tracer distribution in expected brain regions. Impaired motor control and dopaminergic lesion were found in some animals treated with the high radioactivity dose. This effect was completely abolished by reducing the dose to  $20 \pm 5$  kBq. There was also no increase in the double strand DNA breaks

in the brain tissues treated with the lower dose as compared to the controls. Gradual  $^{52}\text{Mn}$  transport along the mesolimbic pathway could be observed in dynamic PET images.

**Conclusions:**  $^{52}\text{Mn}$  traces neuronal pathways which can be imaged with PET. The optimized experimental protocol prevents lesioning dopaminergic neurons and affecting the rotation behavior up to 4 weeks post-injection in rats. Stages of the progressive movement of the tracer along the dopaminergic pathway can be visualized.

## PS01-084

### Poster Viewing Session I

#### [ $^{18}\text{F}$ ]-Fluoromisonidazole PET/MRI imaging exhibits hypoxic-ischemic tissue around the hematoma in experimental intracerebral hemorrhage

**N. Gómez-Lado<sup>1</sup>, C. Correa-Paz<sup>2</sup>, L. García-Varela<sup>1</sup>, E. López-Arias<sup>2</sup>, Á. Ruibal<sup>1</sup>, J. Castillo<sup>2</sup>, J. Pardo-Montero<sup>1</sup>, F. Campos<sup>2</sup>, P. Aguiar<sup>1</sup> and T. Sobrino<sup>2</sup>**

<sup>1</sup>Health Research Institute of Santiago de Compostela - Universidade de Santiago de Compostela, Molecular Imaging Research Group - In Vivo Molecular Imaging and Medical Physics Group, Santiago de Compostela, Spain

<sup>2</sup>Health Research Institute of Santiago de Compostela, Clinical Neurosciences Research Laboratory, Santiago de Compostela, Spain

#### Abstract

**Objective:** Hematoma expansion is one of the factors more associated to poor outcome in intracerebral hemorrhage (ICH) patients. In this regard, some studies have suggested that an “ischemic penumbra” might arise when the hematoma has a large expansion. However, clinical studies are inconclusive. Therefore, our aim was to study the presence of hypoxic-ischemic tissue around the hematoma by means of [ $^{18}\text{F}$ ]-Fluoromisonidazole ([ $^{18}\text{F}$ ]-FMISO) PET/MRI in an experimental ICH model.

**Methods:** We used SD rats (350–375 g). Rats were randomized into: 1) control group (SD normal rats; n=3); 2) ICH group (SD rats subjected to collagenase-induced ICH; n=6). [ $^{18}\text{F}$ ]-FMISO was intravenous administered in both groups. [ $^{18}\text{F}$ ]-FMISO PET studies were performed at different post-ICH times within the hematoma expansion period: 18, 24, 42 and 48 hours. FMISO uptake was